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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,831	10/03/2005	Jun Izumi	1217-052758	3943

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EXAMINER	
ASINOVSKY, OLGA	
ART UNIT	PAPER NUMBER
1796	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/551,831	IZUMI ET AL.	
	Examiner	Art Unit	
	OLGA ASINOVSKY	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *Aug. 14, 2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Preliminary amendment of 10/03/2005 is noted.

Claims 1-34 are under examination.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodemura U.S. Patent 6,472,082 in view of JP2002196535 A.

Kodemura discloses a modified thermoplastic norbornene polymer obtained by graft-modifying process in the presence of organic peroxide. A thermoplastic norbornene resin is a cycloolefin having ethylene segment, column 2, lines 43-55; column 6, lines 1-25, wherein radicals R^1 to R^8 is/are in the form of hydrocarbon group; column 5, lines 53-67; columns 7-13. Claimed cycloolefin copolymer is readable in Kodemura invention, for the **present claims 1 -34**.The graft monomer includes unsaturated carboxylic compound including carboxylic acid and maleic acid, column 14, lines 13-55, for the **present claims 2, 4, 7, 21, 22.** In Kodemura invention claimed cycloolefin copolymer, modifier compound having functional group and organic peroxide are readable for the **present claims 1-34**. Kodemura discloses a process for producing graft modified norbornene polymer in the organic solvent medium in the presence of peroxide at a temperature of 60 to 350 C, column 15, line 51, and under nitrogen with stirring at 40 C,

column 26, Example 1. The organic peroxide compound, see column 15, lines 36-40, is readable in the **present claims 9-10, 26-29**. The amount of organic peroxide initiator is added in the range of 0.001 to 10 parts by weight per 100 parts by weight of the unmodified thermoplastic norbornene polymer, column 15, lines 43-45, for the **present claims 30-34**. The resulting modified thermoplastic norbornene polymer has **high rate of graft modification of at least 10** mol% and can be prepared into high concentration solution, column 4, lines 19-26 and column 16, lines 22-55. The rate of graft modification of the modified thermoplastic norbornene polymer is generally within a range of 10 to 100 mol %, column 16, lines 35-36. The high grafting rate for introducing carboxylic groups for producing a carboxylated cycloolefin copolymer is readable in **the present claims 1-34 for producing high percentage of the functional group being in the range of at least 20% specified in the present claims 1 and 5**. A graft-modified thermoplastic norbornene polymer having the high rate of graft modification is diluted with an unmodified thermoplastic norbornene polymer to produce a graft-modified thermoplastic norbornene polymer having the desired rate of graft modification, column 15, lines 3-15. Therefore, **using the combination of graft-modified cycloolefin copolymer with a base cycloolefin=unmodified cycloolefin copolymer is disclosed in Kodemura invention, for the present claims 1-34**. The high rate of graft modification is preferred for obtaining adhesion property to metals and ability to uniformly disperse various kinds of compounding additives, column 16, lines 38-44. The molecular weight distribution of the thermoplastic norbornene polymer is 4.0 or lower, more preferably 2.5 or lower, column 13, lines 55-62. The resulting modified

thermoplastic norbornene polymer has excellent in heat resistance, electrical properties such as dielectric constant, moisture resistance, adhesive properties, and suitable for use as overcoats, interlayer, column 4. lines 1-2; column 4, lines 41-47; column 38, lines 60-62; column 39, lines 9-12, for **the present claims 11-19.**

Kodemura does not disclose a distribution degree of the graft-modified cycloolefin copolymer in the base polymer in the claimed range of 0.01 to 0.1 (in claims 1, 4, 6 and 20).

It would have been obvious to one of ordinary skill in the art to use a process for graft-modification of norbornene polymer in Kodemura invention wherein said graft-modified norbornene polymer is diluted with an unmodified thermoplastic norbornene polymer to produce a graft-modified thermoplastic norbornene polymer having the desired rate of graft modification (column 15, lines 3-15), and, therefore, obtain the desired distribution of at least claimed range of 0.01, because the desired distribution is depending on the desired graft modification for obtaining suitable adhesive property and ability to uniform disperse various kinds of compounding additives, column 16, lines 38-44 in Kodemura.

Kodemura does not disclose the empiric equation represented by formula (1) in claims 1, 6 and 20 referring to a calculation of the distribution degree of the functional group-modified cycloolefin copolymer in the base copolymer. This formula is based on the experiments for obtaining the desired properties for desired application. Formulae are drawn to value that are inherent to the resulting product in Kodemura invention. No reason to believe that a different product has been made over that taught by the Patent.

Kodemura does not disclose acid value of the carboxyl group in the range of 20 to 200 mg/KOH/g for the present claim 3.
However, Kodemura discloses a high grafting rate of carboxylic group on to cycloolefin resin. High grafting rate is associated with high oxidation property that is a benefit for adhesive properties and ability disperse various kinds of compounding additives, column 16, lines 38-44.

JP 2002196535 discloses alpha-olefin-cycloolefin copolymer which is grafted by a monomer having carboxyl group. The acid value is in the range of 2 to 80 mgKOH/g, abstract. The acid value of the resulting graft-modified cycloolefin copolymer of from at least 20 to 80 mgKOH/g is within the rage specified in the present claim 3.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a grafting process condition in Kodemura invention for producing a high rate of carboxylic acid modified cycloolefin copolymer such that the acid value of the resulting graft product is within the range to at least 20 mgKOH/g as by teaching in JP'535, since the acid value is depending on the degree of grafting carboxylic group, and because Kodemura discloses a high rate of graft-modification (column 4, lines 19-26 and column 16, lines 30-31), as a benefit for having desired adhesive properties and ability disperse various kinds of compounding additives, and, thereby, obtain the claimed requirement.

3. Claims 1-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al U.S. Patent 5,585,433 in view of Kodemura U.S. Patent 6,472,082 and further in view of JP 2002196535 A.

Yamamoto discloses cycloolefin resin composition comprising a cycloolefin random copolymer and a graft-modified product of the random cycloolefin copolymer, abstract. A cycloolefin random copolymer comprises ethylene units in an amount of 52 to 90% by mol, and units from cycloolefin in an amount of 10 to 48% by mol, column 19, lines 19-24. The starting base cycloolefin copolymer in Yamamoto is readable in **the present claims**. The cycloolefin copolymer is graft modified by carboxylic acids including acrylic acid, maleic acid, column 20, lines 58-67, for **the present claims 1, 2, 3, 4, 21, 22, 23, 24, 25**. The process for graft-modification is carried out in a solvent in the presence of the radical initiator at a temperature of 60 to 350 C, column 21, lines 20-65, for **the present claim 4**. The radical initiator column 21, lines 45-65 is readable in **the present claims 9-10, 26-29.** The amount of radical initiator is used in the range of 0.001 to 5 parts by weight based on 100 parts by weight of the unmodified cycloolefin resin, column 21, lines 43-44. The amount of the maleic anhydride added in the graft-modified cycloolefin copolymer was 0.83% by weight, column 34, line 60. The desired graft modification rate is in the range 0.01 to 5% by weight, column 21, line 37. Graft modification rate is controlled by using said graft-modified cycloolefin resin for desired application. A high graft-modified cycloolefin resin is diluted with an unmodified cycloolefin resin to give a graft-modified cycloolefin resin of a desired graft modification

rate, column 21, lines 28-33. Therefore, **Yamamoto discloses the combination of graft-modified cycloolefin copolymer with a base cycloolefin=unmodified cycloolefin copolymer for the present claims 1-34.** The modified product has excellent resistance to greases, good mechanical properties, high resistance to solvents and low water absorption, and dielectic properties, column 2, lines 20-31, and column 1, lines 60-63. The composition can be used for producing a molded product, column 30, line 53, **for the present claims 11-19**.

Yamamoto does not disclose high percentage of added functional group in the range of 20 to 90% for the present claims 1 and 5.

Kodemura and JP' 535 have been discussed above.

In Kodemura invention the rate of graft modification of the modified thermoplastic norbornene polymer is generally within a range of 10 to 100 mol %, column 16, lines 35-36. The high grafting rate for introducing carboxylic groups for producing a carboxylated cycloolefin copolymer is readable in **the present claims 1-34 for producing high percentage of the functional group being in the range of at least 20% specified in the present claims 1 and 5**.

Yamamoto and Kodemura disclose graft-modification of cycloolefin copolymer by introducing carboxylic acid or maleic acid.

It would have been obvious to one of ordinary skill in the art at the time of the present invention to modify a process for graft-modification of cycloolefin copolymer in

Yamamoto invention for producing a high rate of graft modification such that the percentage of the functional group is of at least 20% as by teaching in Kodemura, since the both reference disclose a high rate of graft modification, and the high rate of carboxylic group is a benefit to improve adhesive property of the resulting graft-modified cycloolefin copolymer.

Also, Yamamoto does not disclose acid value of the carboxyl group in the range of 20 to 200 mgKOH/g for the present claim 3.

JP 2002196535 discloses alpha-olefin-cycloolefin copolymer which is grafted by a monomer having carboxyl group. The acid value is in the range of 2 to 80 mgKOH/g, abstract. The acid value of the resulting graft-modified cycloolefin copolymer of from at least 20 to 80 mgKOH/g is within the rage specified in the present claim 3.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a grafting process condition is each reference to Kodemura or Yamamoto for producing a carboxylic acid modified cycloolefin copolymer such that the acid value of the resulting graft product is within the range of at least 20 mgKOH/g as by teaching in JP'535, because the acid value is depending on the degree of grafting carboxylic acid containing monomer as a benefit to improve adhesive property to a substrate and wherein the grafting process is controlled in each Kodemura and Yamamoto invention for obtaining a high grafting level.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References have been considered. The closest reference is WO 98/18837 that belongs to the patent family to U.S. Patent 6,472,082, which is discussed above.

JP 6172423 discloses a copolymer of an alpha-olefin with a cyclic polyene and then modifying the resultant produced random copolymer by introducing a functional group (Abstract). Reference does not disclose a blend of modified cycloolefin copolymer with an unmodified cycloolefin, nor acid value of graft-modified cycloolefin.

JP 10 007736 discloses polyene norbornene compound being graft-modified, (Abstract). By reviewing the disclosure, the grated monomer is ethylenically unsaturated monomer. There is no modifier compound having functional hydrophilic group.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to OLGA ASINOVSKY whose telephone number is (571)272-1066. The examiner can normally be reached on 9:00 to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Olga Asinovsky
Examiner
Art Unit 1796

O.A.
August 01, 2008

/Randy Gulakowski/

Supervisory Patent Examiner, Art Unit 1796